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AMENDMENTS TO THE CLAIMS

1. (previously presented) A method of computing a fast Fourier transform in a plurality of computation stages, the method comprising:

(a) receiving N time-ordered first data values;

(b) sequentially storing in a first memory each of said N time-ordered first data values in the time-order;

(c) storing in a second memory a plurality of twiddle factors in a bit reversed order;

(d) reading a predetermined number R of input butterfly data values of said N first data values, wherein said predetermined number R of input butterfly data values are separated by N/R first data values in said N time-ordered first data values;

(e) performing a radix R butterfly calculation on said predetermined number R of input butterfly data values using at least one of the plurality of twiddle factors stored in the second memory to generate R output butterfly data values;

(f) storing said R output butterfly data values in sequential memory locations of a third memory; and

(g) performing said steps (c) - (f) N/R x 2 times, wherein the predetermined number R is the same predetermined number each time the steps (d) - (f) are performed,

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wherein said reading step (d) includes reading the R output butterfly data values from said third memory,

wherein the memory store operation performed in said storing step (f) has a unity stride, thereby allowing R output butterfly data values to be read from contiguous memory locations each time the R output butterfly data values are read from said third memory, and

wherein said steps (a) - (g) are performed in each one of the plurality of computation stages.

2. (previously presented) The method as in claim 1 further comprising the steps of:

replacing said N first data values in said first memory with selected ones of said R output butterfly data values stored in said third memory location;

repeating steps (c) - (g) a total of $\log_r(n)$ times.

3. (previously presented) The method as in claim 1, wherein said predetermined number R equals 2.

4. (previously presented) The method as in claim 1, wherein said predetermined number R equals 4.

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5. (previously presented) Apparatus for calculating a fast Fourier transform, the apparatus comprising:

a plurality of computation stages, each computation stage comprising

a first processor stage having an output including

a first memory storing N time-ordered first data values, said N first data values being stored in said first memory sequentially in the time-order,

a second memory storing a plurality of twiddle factor values, said plurality of twiddle factor values being stored in said second memory in a bit-reversed order,

a third memory storing a plurality of output butterfly data values, and

a fast Fourier transform calculator coupled to said first, second, and third memories, said fast Fourier transform calculator being operative

to receive a predetermined number R of selected input butterfly data values of said N first data values, the predetermined number R of input butterfly data values being separated by N/R first data values,

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to receive at least one twiddle factor value from said second memory,

to perform a radix R butterfly calculation to calculate R output butterfly data values using the at least one twiddle factor value,

to write said R output butterfly data values into sequential memory locations of said third memory, and

to perform said second receiving operation, said first performing operation, and said writing operation N/R x 2 times, wherein the predetermined number R is the same predetermined number each time the second receiving, the first performing, and the writing operations are performed, and

a second processor stage coupled to said output of said first processor stage,

wherein calculations performed in said second processing stage include reading the R output butterfly data values from said third memory, and

wherein the memory write operation performed by said fast Fourier transform calculator into the sequential memory locations of said third memory has a unity stride, thereby allowing R output butterfly data values to be read from contiguous memory each time

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the R output butterfly data values are read from said third memory.

6. (previously presented) The apparatus of claim 5 wherein the predetermined number R equals 2.

7. (previously presented) The apparatus of claim 5 wherein the predetermined number R equals 4.

8. (previously presented) Digital signal processing apparatus for performing a fast Fourier transform calculation, comprising:

a plurality of computation stages, each computation stage comprising

a first processor stage having an output and including

a digital signal processor operative

to receive N time-ordered first data values,

to sequentially store in a first memory each of said N first data values in the time-order,

to store in a second memory a plurality of twiddle factors in a bit reversed order,

to read a predetermined number R of input butterfly data values of said N first data values, wherein said predetermined

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number R of input butterfly data values are separated by N/R data points in said N time-ordered first data values,

to perform a radix R butterfly calculation on said predetermined number R of input butterfly data values,

to provide R output butterfly data values using at least one of said plurality of twiddle factors,

to sequentially store said R output butterfly data values in sequential memory locations of a third memory, and

to perform said first storing operation, said reading operation, said first performing operation, said providing operation, and said second storing operation N/R x 2 times, wherein the predetermined number R is the same predetermined number each time the first storing, the reading, the first performing, the providing, and the second storing operations are performed, and

a second processor stage having an input coupled to said output of said first processor stage,

wherein calculations performed in said second processor stage include reading the R output butterfly data values from said third memory, and

wherein the memory store operation performed by said digital signal processor in the sequential memory locations of said third

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memory has a unity stride, thereby allowing R output butterfly data values to be read from contiguous memory locations each time the R output butterfly data values are read from said third memory.

9. (new) A method of computing a fast Fourier transform in a plurality of computation stages, the method comprising:

(a) receiving N time-ordered first data values;

(b) sequentially storing in a first memory each of said N time-ordered first data values in the time-order;

(c) storing in a second memory a plurality of twiddle factors in a bit reversed order;

(d) reading a predetermined number R of input butterfly data values of said N first data values, wherein said predetermined number R of input butterfly data values are separated by N/R first data values in said N time-ordered first data values;

(e) performing a radix R butterfly calculation on said predetermined number R of input butterfly data values using at least one of the plurality of twiddle factors stored in the second memory to generate R output butterfly data values;

(f) storing said R output butterfly data values in sequential memory locations of a third memory; and

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(g) performing said steps (c) - (f) N/R x 2 times, wherein the predetermined number R is the same predetermined number each time the steps (d) - (f) are performed,

wherein said reading step (d) includes reading the R output butterfly data values from said third memory, and

wherein said steps (a) - (g) are performed in each one of the plurality of computation stages.

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